HABITAT CHARACTERISTICS OF *PALAEODIPTERON WALKERI* (DIPTERA: NYMPHOMYIIDAE)[1,2]

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ABSTRACT: The southernmost collection of a Nearctic nymphomyiid (Diptera) is recorded from central Pennsylvania, U.S.A. Immatures occurred in a cold, forested stream of circumneutral pH and low alkalinity. The associated insect fauna included other northern elements such as the caddisfly, *Psychoglypha subborealis,* and the black fly, *Prosimulium fontanum.*

Nyphomyiids are minute, nematocerous flies with aquatic immature stages. Four species are known worldwide, one of which, *Palaeodipteron walkeri* Ide, is Nearctic. Previous records show *P. walkeri* to be common in parts of New Brunswick and Quebec, Canada (Back and Wood 1979; Eidt and Weaver 1983). Collections from Maine represent the only previously published record for the United States (Mingo and Gibbs 1976). We record here a 450-km southward extension of the previously known range of a North American nymphomyiid.

During a study of the aquatic fauna in Smays Run (40° 53' 48" N x 78° 01' 13" W), Moshannon State Forest, Centre County, Pennsylvania, our drift nets (500-μm mesh) collected one nymphomyiid pupa on 30 June 1983 and one pupal exuvium on 6 July 1983. On 6 October 1983, 11 larvae and one pupa were collected by washing stones in 95% ethanol (method of Back and Wood 1979). All specimens were deposited in the Frost Entomological Museum, The Pennsylvania State University. Although adults were not collected, immatures conform to the description of *P. walkeri* (Kevan and Cutten 1981). Evidently, at least two generations are produced annually in central Pennsylvania.

Smays Runs is a well-shaded stream originating as a series of springs approximately 1 km upstream from the sampling station. The streambed is composed of sand, gravel, and stones covered with moss (*Fontinalis*) and

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aquatic macrophytes (*Callitriche*). Chemical and physical parameters of Smays Run indicate a cold, low-alkalinity stream with circumneutral pH (Table 1). Vegetation along the watercourse is characterized by *Pinus strobus* L., *Tsuga canadensis* (L.), *Alnus rugosa* (De Roi), *Rhododendron maximum* L., *Prunus virginiana* L., *P. serotina* Ehrh., *Amelanchier* sp., *Crataegus* spp., and *Acer rubrum* L.

The dominant aquatic insect taxa and their relative densities[6] in Smays Run were *Paraleptophlebia* spp. (1.7%), *Ephemerella dorothea* Needham (4.8%), *Eurylophella* sp. (4.6%) [Ephemeroptera]; *Amphinemura nigritta* (Provancher) and *A. wui* (Claassen) (1.3%), *Leuctra duplicata* Claassen and *L. ferruginea* (Walker) (9.4%) [Plecoptera]; *Promoresia tardella* Fall (3.1%) [Coleoptera]; *Simulium venustum* Say cytospecies CC (6.7%), Chironomidae (40%), *Chelifera* sp. (2.7%) [Diptera]; and *Lepidostoma* spp., including *L. frostei* (Milne) and *L. ontario* Ross (1.7%) [Trichoptera].

The Moshannon State Forest is a region with numerous northern floral and faunal elements. Like the nymphomyiids, other insects characteristic of northern streams are found in Smays Run. These include *Psychoglypha subborealis* (Banks) [Trichoptera], previously known from Ontario, Newfoundland, Maine, and Michigan, and *Prosimulium fontanum* Syme & Davies [Diptera], with its southernmost record in central Pennsylvania.

We predict the occurrence of nymphomyiids still farther south along the Appalachian cordilleras in environments similar to that of Smays Run.

Table 1. Chemical and physical parameters for Smays Run, Centre County, Pennsylvania (26 April to 17 August 1983).

	Minimum	Median	Maximum	Sample Size
Temperature (°C)	5	10	13	25
Alkalinity (mg $CaCO_3$/1)	2.7	5.2	9.5	40
Specific Conductance (μS)	28	36	45	40
Dissolved Oxygen (mg/1)	9.6	10.6	11.2	18
Nonfilterable Residue (mg/1)	1	3	10	37
pH	6.4	6.9	7.8	42
Velocity (m/sec)	0.04	0.10	0.30	9
Width (m)	2.2	3.2	4.9	45
Discharge (m^3/sec)	0.023	0.080	0.159	10

[6]Determined from 20 (0.1 m^2) benthic samples taken on each of 19 dates (1 June - 17 August 1983), with a 500-μm mesh collecting net.

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